Remarks

Drawing corrections.

Figures 1-6 (all of the figures) are amended by revised drawings shown on five replacement sheets attached hereto. The replacement sheets effect the following corrections:

a) Figures 2-5 – extraneous information such as "confidential" and copyright notices are removed.

b) Handwritten portions, such as reference numbers, are replaced with machine typing.

c) In Figure 3, block 304, the letter "c" in the word "Tecdmdogy" is removed. The Examiner correctly observed that it should not have been present.

Applicant requests that the Examiner please review and accept the replacement sheets of drawings.

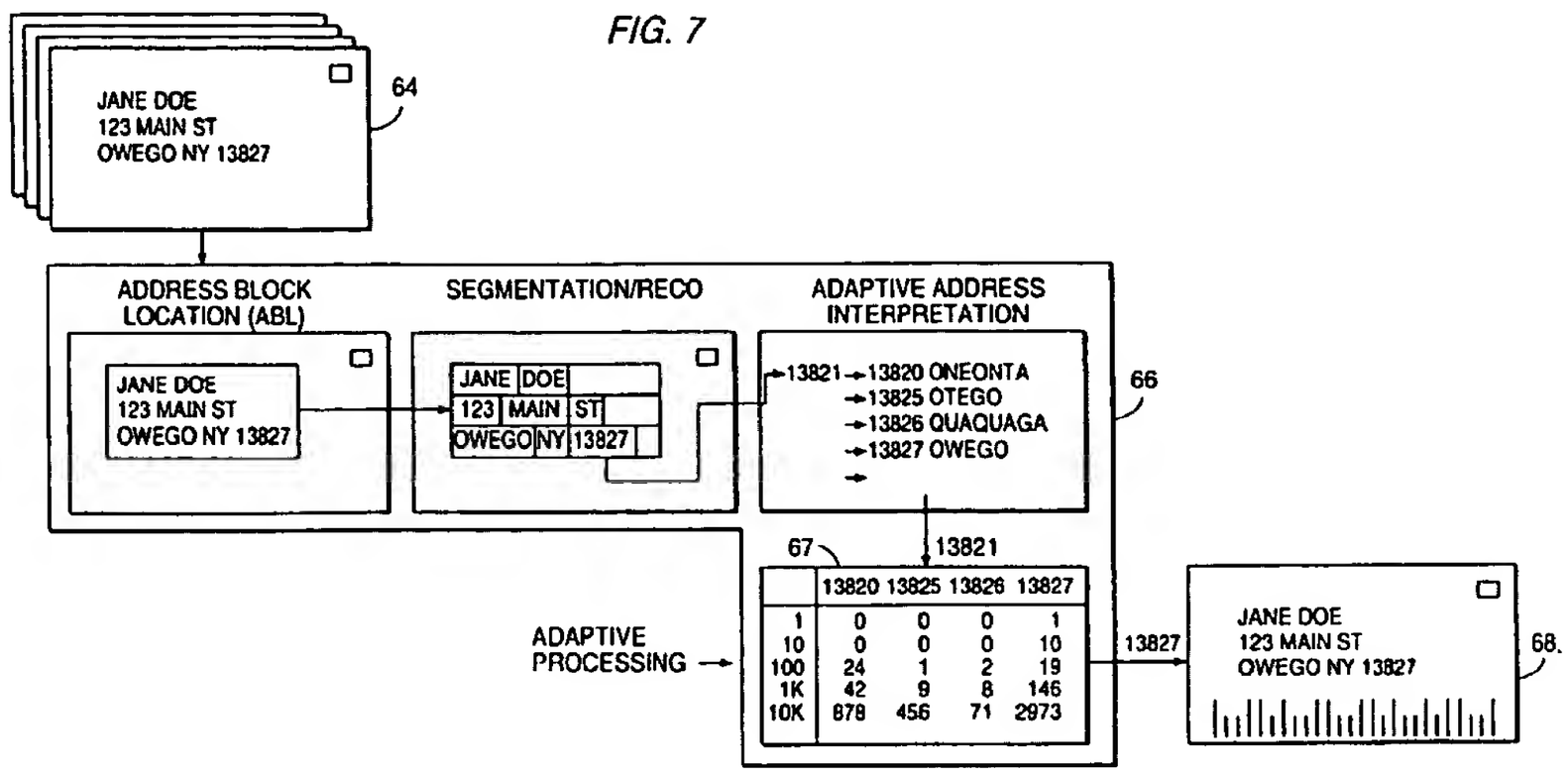
Office Action paragraph 3 (page 3).

Claims 1-3, 7-12, 14 and 16-20 were rejected under 35 USC §102(b) as anticipated by U.S. Pat. No. 5,805,710 to Higgins et al. ("Higgins"). Applicant respectfully traverses these rejections and requests reconsideration for the following reasons.

Higgins discloses a system to identify cursive addresses and improve recognition by means of statistical occurrences. Once the print style is determined to be cursive, the zip code is located using standard recognition techniques. City and State are located and recognized using standard cursive recognition techniques. Words that are ambiguous are resolved through a <u>statistical occurrence database, which measures frequency and location of words.</u>

Higgins thus teaches taking a proposed string, say an address, and "adaptive processing" a set of possible solutions against a statistical database to determine which is more likely the correct result. The solution with the highest probability score is selected, as illustrated in Higgings' FIG. 7 shown below:

FIG. 7



The present Applicant's Orthogonal Technology does not use statistical occurrences to improve recognition results. Rather, the present invention in a preferred embodiment changes recognition parameters to create alternate possibilities of Address Blocks, lines, words, and/or characters, when a recognition is unsuccessful (e.g., it does not match a string in a database). Thus, when the database returns a negative (no match) result, alternate possibilities are created and pinged against the database. This is done repeatedly until a predetermined time limited is reached or the potential alternates are exhausted (or some other limit is encountered). Note that the input piece is not rescanned. Nor is ambiguity resolved by use of a statistical database as taught by Higgins.

The present invention, by adjusting one or more recognition parameters, generates alternative "solutions" until one matches a database entry. In this regard, please note that applicant's claim 1 recites in pertinent part:

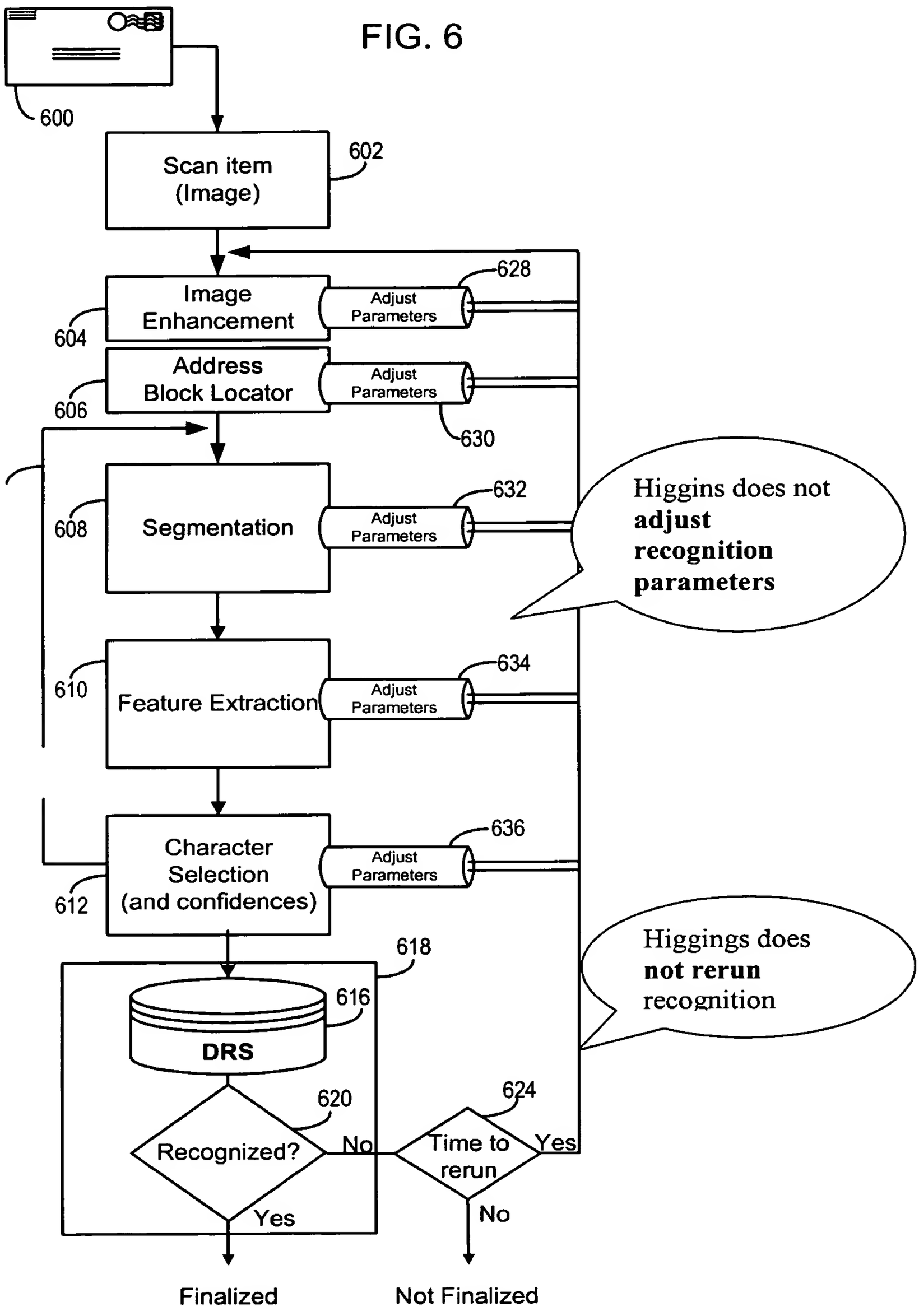
"1. An iterative character recognition method employing a database of predetermined character strings, the method comprising the steps of ...

(d) if the proposed result string does not match any of the predetermined character strings, adjusting the initial parameter setting of the recognition subroutine; and then

(e) repeating steps (b) and (c) to generate a next proposed result string and to determine whether the next proposed result string matches any of the predetermined character strings."

This aspect of the present invention is illustrated in one embodiment in Applicant's Figure 6 as shown below (comments in bubble callouts are added):

FIG. 6



It is well settled that under 35 U.S.C. § 102:

> "[An invention is anticipated if ...] all the claim limitations [are] shown in a single art prior art reference. Every element of the claimed invention must be literally present, arranged as in the claim. The identical invention must be shown in as complete detail as is contained in the patent claim."

Richardson v. Suzuki Motor Co., Ltd., 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). Clearly Higgins does not anticipate the invention described in Claims 1-3, 7-12, 14 and 16-20 under the law. All of these claims include the limitations of claim 1 discussed above. For these reasons, it is respectfully requested that the rejection be withdrawn.

Office Action paragraph 4 (page 7).

Claims 1-3, 7 and 17-18 were rejected under 35 U.S.C. 102(b) as anticipated by U.S. Pat. No. 5,197,107 to Katsuyama et al. (hereinafter "Katsuyama"). Applicant respectfully traverses the asserted grounds for rejection and requests reconsideration. Katsuyama does not anticipate these claims for at least the following reasons.

First, with regard to the claimed step of "(d) if the proposed result string does not match any of the predetermined character strings, adjusting the initial parameter setting of the recognition subroutine..., the Examiner points out Katsuyama Fig. 12, elements 415, 414. These adjustments are not changing recognition subroutine parameters as is claimed here. Rather, according to Katsuyama, the character (or character image) itself is modified, by magnification in X and or Y directions (stretching or compressing); and, potentially, by thinning or thickening the lines in the image that form a candidate character. See Figure 21 and the Abstract:

> "Before the above comparison, a modification of the above characteristic quantity which is extracted from the image data is carried out, where the modification corresponds to a magnification or reduction of the scale of the above image data to equalize the scale of the above image data of the character with the scales of the characters of which the characteristic quantities are memorized in the above dictionary."

Applicant's claim 1 describes a method that simply receives an image, and works to match it to a predetermined string in a database. It does not do so by changing any characteristic of the input image. Moreover, there is no teaching or suggestion in Katsuyama to modify an address block locator subroutine or line and/ or block segmentation subroutines.

Second, it can be seen that Katsuyama is inapposite, as it is actually directed to the initial setup or calibration of a scanning apparatus. Katsuyama's procedure operates on one or more sample scanned images, and adjusts the apparatus so that, when scanning/ recognition begins in earnest, the input characters will have the same line thickness and scale as the dictionary of characters. Thus, the patent explains: "It is usually unnecessary to carry out the above operation for setting an optimum parameter every time a new character image is input, when the same kind of characters are successively input." See paragraph bridging Columns 10-11.

Third, Katsuyama is fundamentally different from the invention of claim 1 as it describes a character recognition engine, while the present invention is directed to character string recognition. *String recognition* as taught by applicant is not merely repeated character recognition. The goal is to match a predetermined string in a database; not to match individual characters. Claim 1 is amended in the preamble to emphasize this point. The claim explicitly describes string recognition:

"1. (Currently Amended) An iterative character string recognition method employing a **database of predetermined character strings**, the method comprising the steps of:

(a) **receiving** a digital representation of **a character string**;

(b) **generating a proposed result string** by applying a predetermined recognition routine to the received digital representation, the predetermined recognition routine including a recognition subroutine employing an initial parameter setting;

(c) determining whether the **proposed result string matches any of the predetermined character strings**;

(d) if the proposed result string does not match any of the predetermined character strings, adjusting the initial parameter setting of the recognition subroutine; and then

(e) repeating steps (b) and (c) to **generate a next proposed result string** and to determine whether the next proposed result string matches any of the predetermined character strings." [Emphasis added.]

String recognition is dramatically different from individual character recognition. In other words, a string of recognized characters is not the same as a recognized string of characters. Theoretically, if individual characters could be reliably extracted from a field or string, then individual character recognition could be applied. But this is part of the very problem addressed by the present invention;

individual characters cannot easily or reliably be extracted for examination in a vacuum. As observed in applicant's background discussion:

> "In typical practice, character recognition processing generates result strings (strings of recognized characters) which are generally quite close to what is actually on the input piece. However, it is not unusual for character recognition processes to have uncertainty about some characters, or about the exact point of separation between characters. Sometimes, characters are incorrectly recognized, resulting in improper substitution, joinder, or separation of characters reported in the result string...."
>
> "For example, one known technique is to generate multiple character possibilities for each potentially ambiguous character being recognized. A probability or confidence indication is then assigned to each result possibility. The character with the highest confidence is then selected for the result output. While this technique can improve results in many circumstances, picking the highest probability character does not always result in a correct result string. This technique generates result strings with a high probability of being correct, but it does not have the ability to verify the result string against objective standards." See paragraphs [0006-0007].

The present invention is intended to match *strings*; a process which in some cases succeeds even where recognition of individual characters in the string is unreliable. As one illustration, see applicant's example in figure 4. On the first iteration, proposed result string #1, the letter "K" is not recognized even as a possibility; rather, the system "recognizes" it as two adjacent letters "I" and "C." But that is not what is tested against the database. Rather, in accordance with the present invention, the entire proposed string it tested against the database. See paragraph [0029]. In the illustration, that test failed, one or more parameters were adjusted, and the process generates a new proposed string. The new string is tested against the database, and so on.

There is no teaching or suggestion of this string recognition technique in Katsuyama. With regard to the language of claim 1, the Examiner refers, for example, to column 6, lines 26-28. That text (the first boldface portion), together with the surrounding context reads as follows:

> "According to a ninth aspect of the present invention, there is provided a character recognition apparatus, comprising the same construction as either of the above second to eighth aspects of the present invention, and **further, comprising: a successive character strings region recognizing means for recognizing a successive character strings region including successive character strings**, in an image of a document comprised of a character strings region including a successive character strings which are printed with intervals within a predetermined range, and a continuous image region; a character

string region recognizing **means for recognizing each character string in the above character strings region; a character region recognizing means for recognizing each character region indicating an individual character, from the above image data; a dictionary for memorizing characteristic quantities of characters; a characteristic quantity extracting means for extracting a characteristic quantity from the image data in the above character region; and a character search means for determining a character represented by an image data, by comparing the characteristic quantity which is extracted from the image data,** with the characteristic quantities of characters which are memorized in the dictionary. The above character recognition apparatus is characterized in further comprising a characteristic quantity magnification/reduction means for carrying out a modification of the above characteristic quantity which is extracted from the above image data, where the modification is equivalent to a magnification or reduction of the above image data to equalize the scale of the above image data of the character with the scales of standard characters...." Katsuyama at column 6, lines 22-54 (emphasis added).

Thus, it is clear that Katsuyama attempts to (1) find a string; (2) recognize individual character regions within a string region; and (3) apply to each individual character region the very same methodology as is described throughout the patent for individual character recognition; i.e., by "extracting a characteristic quantity from the image data in the above character region" and comparing that to a dictionary, applying magnification/ reduction, etc. In short, Katsuyama suggests applying his individual character recognition technique to a string. The result, if successful, will be a string of recognized characters; NOT a recognized string of characters. There is no suggestion, for example, to test a proposed string against a database of predefined strings as described in applicant's claims. For these reasons, the rejections based on Katsuyama should be reconsidered and withdrawn.

Office Action paragraph 5 (page 8).

Claims 1 and 17-18 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,041,141 to Yamamoto et al. (hereinafter "Yamamoto"). Applicant respectfully traverses the asserted grounds for rejection and requests reconsideration. Yamamoto does not anticipate these claims for at least the following reasons.

The passages cited by the Examiner from the Yamamoto patent do not in fact anticipate the limitations of claim 1 as proposed by the Examiner. To begin, the passage at column 43, line 65-66, does refer to a database of predetermined character strings in that it recites a "word dictionary," *i.e.*, a collection of words. Applicant would agree that words are an example of character strings. Continuing,

the passage at column 12, line 22, refers to a character string image storage portion which could potentially read on applicant's limitation (a).

The second limitation of claim 1 calls for: "(b) generating a proposed result string by applying a predetermined recognition routine to the received digital representation, the predetermined recognition routine including a recognition subroutine employing an initial parameter setting." The Examiner cites column 39, lines 13-16, 32-34. Those passages, read in context, describe a process generally as follows:

(1) The Yamamoto system applies individual character recognition to form a set of candidate characters.

(2) "A phrase search portion 3-13 searches a word dictionary 3-16, selects a combination of candidate characters coincident with some words existing in the dictionary 3-16 from combinations of sets of candidate characters." [Column 39, lines 21-24].

(3) Next, the Yamamoto system "selects a combination of words capable of forming a phrase by referring to a grammatical dictionary 3-17. A phrase evaluating value-calculating portion 3-14 calculates a value indicating the correctness of the phrase in terms of vocabulary and grammar, the phrase being searched by the phrase search portion 3-13. The calculation is performed, based on the lengths and frequencies of words contained in the phrase." [Column 39, lines 25-32.]

(4) And finally, "A phrase-selecting portion 3-15 selects that of the candidate phrases which have the greatest evaluation value, and delivers a modified character string." [Column 39, lines 32-34.]

Applicant's claim 1, step (c), calls for determining whether the proposed result string matches any of the predetermined character strings. As just described, the Yamamoto process picks some words that can be formed from the candidate characters, and then composes candidate phrases using those words. Importantly, the "proposed result string" according to Yamamoto is not a phrase that exists in the "word dictionary" of predetermined character strings. Yamamoto does not teach or suggest that all valid phrases are predetermined and stored in the database. Again, it merely teaches storing a database of words, which are then stitched together to create candidate phrases, but there is no database of correct phrases against which candidate phrases could be tested. This methodology does not meet the limitations of applicant's claim 1. Similar arguments apply with regard to claims 17 and 18. Those claims also require matching a proposed result string against a database of acceptable result strings, contrary to the system described by Yamamoto, et al.

Office Action paragraph 6 (page 10).

Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Higgins, et al. The Examiner states that using the expiration of a predetermined duration of time is a known termination condition "routinely implemented in iterative processing." While applicant acknowledges that this type of termination condition is known in some contexts, the other limitations of claims 4 and 5 are not met for the reasons explained above in the previous discussion of Higgins, et al. Essentially the same remarks apply to the rejection of claim 5 under § 103(a).

Office Action paragraphs 8-9 (pages 11-12).

Claim 6 was rejected as unpatentable over Higgins, et al., in view of U.S. Patent No. 5,240,116 to Stevens, et al. Applicant respectfully traverses this ground of rejection and requests reconsideration. The Examiner acknowledged that Higgins does not explicitly disclose the method of claim 2 wherein the predetermined recognition routine is a magnetic-ink character recognition routine. Again, while such subroutines may be known in some contexts, Higgins fails to disclose or suggest the other limitations of claim 6 for the reasons explained earlier. For that reason, as with regard to claims 4 and 5, the proposed combination does not establish a *prima facie* case of obviousness. The same argument applies to the rejection of claims 13 and 15.

Conclusion.

Applicant submits that the application is now in condition for allowance. If the Examiner has any concerns about the application, or if the undersigned attorney can assist in expediting the allowance of the application, the Examiner is invited to please call the undersigned attorney.

Respectfully submitted,

By _____
Micah D. Stolowitz
Registration No. 32,758

STOEL RIVES LLP
900 SW Fifth Avenue, Suite 2600
Portland, Oregon 97204-1268
Telephone: (503) 224-3380
Facsimile: (503) 220-2480